1. A method for treating pain, treating inflammation or providing analysis in a subject, comprising administering to a subject in need thereof an effective amount of a therapeutic compound, wherein the therapeutic compound is of the formula (Ia):

(Ia) 
$$F_{1} \xrightarrow{G_{2}} F_{2}$$

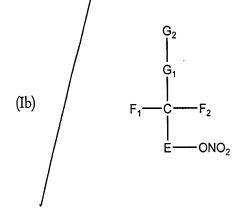
$$E \xrightarrow{ONO_{2}} ONO_{2}$$

in which E, F<sub>1</sub>, F<sub>2</sub>, G<sub>1</sub>, and G<sub>2</sub> are the same or different organic radicals which may be joined in cyclic ring systems, and which may contain inorganic counterions;

with the proviso that when E and  $G_{\lambda}$  are methylene groups and  $F_1$  is H,  $G_2$  is not a nitrate group, nor  $R^N$ - $Z^N$ -;

wherein  $R^N$  is any aryl or heteroary group and  $Z^N$  is  $(CO)_{mm}^- X^N_{nn}^- Y^N_{oo}$ ; wherein mm, nn, oo are 0 or 1 and  $X^N, Y^N$  are NH,  $NR^{NN}$ , O or  $CH_2$ ; wherein  $R^{NN}$  is a short chain alkyl group  $(C_1 - C_{12})$ .

2. A method for treating pain, treating inflammation or providing analysis in a subject, comprising administering to a subject in need thereof an effective amount of a therapeutic compound, wherein the therapeutic compound is of the formula (Ib):



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in which  $F_2$  is an organic radical which may be joined in a cyclic ring system with  $G_2$ , and which may contain inorganic counterions; E and  $G_1$  are both methylene groups;  $F_1$  is H; and  $G_2$  is  $\mathbb{R}^N$ - $\mathbb{Z}^N$ -;

wherein  $R^N$  is an organic radical possessing a heter paryl group containing P or S atoms where said P or S are positioned  $\beta$ ,  $\gamma$ , or  $\delta$  to a nitrate group as identified in formula I; and  $Z^N$  is  $W^N_{mm}$ - $X^N_{nn}$ - $Y^N_{oo}$ ;

wherein mm, nn and oo are 0 or 1; and  $W^N$ ,  $X^N$ ,  $Y^N$  are NH,  $NR^{NN}$ , CO, O or CH<sub>2</sub>; wherein  $R^{NN}$  is a short chain alkyl group ( $C_1 - C_{12}$ ).

3. A method for treating pain, treating inflammation or providing analysis in a subject, comprising administering to a subject in need thereof an effective amount of a therapeutic compound, wherein the therapeutic compound is of the formula (Ic):

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(Ic) 
$$\begin{array}{c|c}
G_1 \\
G_1 \\
F_1 - C - F_2 \\
E - ONO_2
\end{array}$$

in which E is  $(R^1R^2C)_m$  and  $G_2 - G_1 - CF_1F_2 - is R^{19} - (R^3R^4C)_p - (R^{17}R^{18}C)_n - ig$  wherein: m, n, p are integers from 0 to 10;

R<sup>3,17</sup> are each independently hydrogen, a nitrate group, or A; and R<sup>1,4</sup> are each independently hydrogen, or A;

where A is selected from a substituted or unsubstituted aliphatic group (preferably a branched or straight-chain aliphatic moiety having from 1 to 24 carbon atoms in the chain, which optionally may contain O, S, NR<sup>6</sup> and unsaturations in the chain, optionally bearing from 1 to 4 hydroxy, nitrate, amino, aryl, or heterocyclic groups; an unsubstituted or substituted cyclic aliphatic moiety having from 3 to 7 carbon atoms in the aliphatic ring, which optionally may contain O, S, NR<sup>6</sup> and unsaturations in the ring, optionally bearing

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from 1 to 4 hydroxy, nitrate, amino, aryl, or heterocyclic groups; an unsubstituted or substituted aliphatic moiety constituting a linkage of from 0 to 5 carbons, between R¹ and R³ and/or between R¹ and R⁴, which optionally may contain O, S, NR6 and unsaturations in the linkage, and optionally bearing from 1 to 4 hydroxy, nitrate, amino, aryl, or heterocyclic groups); a substituted or unsubstituted aliphatic group (preferably a branched, cyclic or straight-chain aliphatic moiety having from 1 to 24 carbon atoms in the chain) containing carbonyl linkages (e.g., C=O, C=S, C=NOH), which optionally may contain O, S, NR6 and unsaturations in the chain, optionally bearing from 1 to 4 hydroxy, nitrate, amino, aryl, or heterocyclic groups; a substituted or unsubstituted aryl group; a heterocyclic group; amino (including alkylamino, dialkylamino (including cyclic amino, diamino and triamino moieties), arylamino, diarylamino, and alkylarylamino); hydroxy; alkoxy; a substituted or unsubstituted aryloxy;

wherein X is F, Br, Cl, NO<sub>2</sub>, CH<sub>2</sub>, CF<sub>2</sub>, O, NH, NMe, CN, NHOH, N<sub>2</sub>H<sub>3</sub>, N<sub>2</sub>H<sub>2</sub>R<sup>13</sup>, N<sub>2</sub>HR<sup>13</sup>R<sup>14</sup>, N<sub>3</sub>, S, SCN, SCN<sub>2</sub>H<sub>2</sub>(R<sup>15</sup>)<sub>2</sub>, SCN<sub>2</sub>H<sub>3</sub>(R<sup>15</sup>), SC(O)N(R<sup>15</sup>)<sub>2</sub>, SC(O)NHR<sup>15</sup>, SO<sub>3</sub>M, SH, SR<sup>7</sup>, SO<sub>2</sub>M, S(O)<sub>2</sub>R<sup>9</sup>, S(O)<sub>2</sub>R<sup>9</sup>, S(O)<sub>2</sub>OR<sup>3</sup>, PO<sub>2</sub>HM, PO<sub>3</sub>HM, PO<sub>3</sub>HM, PO<sub>3</sub>M<sub>2</sub>, P(O)(OR<sup>15</sup>)(OR<sup>16</sup>), P(O)(OR<sup>16</sup>)(OM), P(O)(R<sup>15</sup>)(OR<sup>8</sup>), P(O)(OM)R<sup>15</sup>, CO<sub>2</sub>M, CO<sub>2</sub>H, CO<sub>2</sub>R<sup>11</sup>, C(O), C(O)R<sup>12</sup>, C(O)(OR<sup>13</sup>), PO<sub>2</sub>H, PΦ<sub>2</sub>M, P(O)(OR<sup>14</sup>), P(O)(R<sup>13</sup>), SO, SO<sub>2</sub>, C(O)(SR<sup>13</sup>), SR<sup>5</sup>, SSR<sup>7</sup> or SSR<sup>5</sup>;

Y is F, Br, Cl, CH<sub>3</sub>, CF<sub>2</sub>H, CF<sub>3</sub>, OH, NH<sub>2</sub>, NHR<sup>6</sup>, NR<sup>6</sup>R<sup>7</sup>, CN, NHOH, N<sub>2</sub>H<sub>3</sub>, N<sub>2</sub>H<sub>2</sub>R<sup>13</sup>, N<sub>2</sub>HR<sup>13</sup>R<sup>14</sup>, N<sub>3</sub>, S, SCN, SCN<sub>2</sub>H<sub>2</sub>(R<sup>15</sup>)<sub>2</sub>, SCN<sub>2</sub>H<sub>3</sub>(R<sup>15</sup>), SC(O)N(R<sup>15</sup>)<sub>2</sub>, SC(O)NHR<sup>15</sup>, SO<sub>3</sub>M, SH, SR<sup>7</sup>, SO<sub>2</sub>M, S(O)R<sup>8</sup>, S(O)<sub>2</sub>R<sup>9</sup>, S(O)OR<sup>8</sup>, S(O)<sub>2</sub>OR<sup>9</sup>, PO<sub>2</sub>HM, PO<sub>3</sub>M<sub>2</sub>, P(O)(OR<sup>15</sup>)(OR<sup>16</sup>), P(O)(OR<sup>16</sup>)(OM), P(O)(R<sup>15</sup>)(OR<sup>8</sup>), P(O)(OM)R<sup>15</sup>, CO<sub>2</sub>M, CO<sub>2</sub>H, CO<sub>2</sub>R<sup>11</sup>, C(O)(R<sup>12</sup>, C(O)(OR<sup>13</sup>), C(O)(SR<sup>13</sup>), SR<sup>5</sup>, SSR<sup>7</sup> or SSR<sup>5</sup>, or does not exist;

R<sup>2</sup>, R<sup>5</sup>, R<sup>18</sup>, R<sup>19</sup> are optionally hydrogen, A or X-Y;

R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>11</sup>, R<sup>12</sup>, R<sup>13</sup>, R<sup>14</sup>, R<sup>15</sup>, R<sup>16</sup> are the same or different alkyl or acyl groups containing 1-24 carbon atoms which may contain 1-4 ONO<sub>2</sub> substituents; or C<sub>1</sub> - C<sub>6</sub> connections to R<sup>1</sup> – R<sup>4</sup> in cyclic derivatives which may contain 1-4 ONO<sub>2</sub> substituents; or are each independently hydrogen a nitrate group or A;

M is H, Na<sup>+</sup>, K<sup>+</sup>, NH<sub>4</sub><sup>+</sup>, N<sup>+</sup>H<sub>k</sub>R<sup>11</sup><sub>(4-k)</sub> where k is 0-3; or other pharmaceutically acceptable counterion;

and with the proviso that when  $m = n = p \neq 1$  and  $R^{19}$ ,  $R^2$ ,  $R^{18}$ ,  $R^1 = H$  and  $R^{17}$ ,  $R^3$  are nitrate groups,  $R^4$  is not H.

4. The method of claim 1, wherein  $F_2$  is a naturate group; and E,  $F_1$ ,  $G_1$ ,  $G_2$  are the same or different organic radicals which may be joined in cyclic ring systems, and which may contain inorganic counterions;

with the proviso that when E and  $G_1$  are methylene groups and  $F_1$  is H,  $G_2$  is not a nitrate group, nor  $\mathbb{R}^N$ - $\mathbb{Z}^N$ -;

wherein  $R^N$  is any aryl or heteroaryl group and  $Z^N$  is  $(CO)_{mm}^- X^N_{nn}^- Y^N_{oo}$ ; wherein mm, nn, oo are 0 or 1 and  $X^N, Y^N$  are NH,  $NR^{NN}$ , O or  $CH_2$ ; wherein  $R^{NN}$  is a short chain alkyl group  $(C_1 - C_{12})$ .

5. The method of claim 2, wherein  $F_2$  is a nitrate group; E and  $G_1$  are methylene groups;  $F_1$  is H; and  $G_2$  is  $R^N$ - $Z^N$ -;

wherein  $R^N$  is an organic radical possessing an heteroaryl group containing P or S atoms where said P or S are positioned  $\beta$ ,  $\gamma$ , or  $\delta$  to a nitrate group as identified in formula I; and  $Z^N$  is  $W^N_{nm}-X^N_{nn}-Y^N_{oo}$ ;

wherein mm, nn, oo are 0 or 1 and  $W^N$ ,  $X^N$ ,  $Y^N$  are NH,  $NR^{NN}$ , CO, O or CH<sub>2</sub>; wherein  $R^{NN}$  is a short chain alkyl group (C<sub>1</sub> – C<sub>12</sub>).

- 6. The method of claim 3, wherein R<sup>19</sup> is X-Y.
- 25 7. The method of claim 6, wherein:

R<sup>1</sup> and R<sup>3</sup> are the same or different and selected from H and C<sub>1</sub>-C<sub>4</sub>, alkyl chains, which chains may include one O linking R<sup>1</sup> and R<sup>3</sup> to form pentosyl, hexosyl, cyclopentyl, or cyclohexyl rings, which rings may optionally bear hydroxyl substituents;

R<sup>2</sup> and R<sup>4</sup> are the same or different and selected from H, a nitrate group, C<sub>1</sub>-C<sub>4</sub> alkyl chains optionally bearing 1-3 nitrate groups, and acyl groups (-C(O)R<sup>5</sup>);

 $R^7$ ,  $R^{11}$  are the same or different  $C_1 - C_8$  alkyl or acyl;

R<sup>5</sup>, R<sup>6</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>12</sup>, R<sup>13</sup>, R<sup>14</sup>, R<sup>15</sup>, R<sup>16</sup> are the same or different and are alkyl groups containing 1-12 carbon atoms which may contain 1-4 ONO<sub>2</sub> substituents; or C<sub>1</sub> or C<sub>2</sub> connections to R<sup>1</sup> - R<sup>3</sup> in cyclic derivatives; and

M is H, Na+, K+, NH<sub>4</sub>+ or N+H<sub>k</sub>R<sup>11</sup><sub>(4-k)</sub>, where k is 0-3.

- 8. The method of claim 7, wherein m = /1, n = 0, p = 1.
- 9. The method of claim 8, wherein:

X is CH<sub>2</sub>, O, NH, NMe, CN, NHOH, N<sub>2</sub>H<sub>3</sub>, N<sub>2</sub>H<sub>2</sub>R<sup>13</sup>, N<sub>2</sub>HR<sup>13</sup>R<sup>14</sup>, N<sub>3</sub>, S, SCN, SCN<sub>2</sub>H<sub>2</sub>(R<sup>15</sup>)<sub>2</sub>, SCN<sub>2</sub>H<sub>3</sub>(R<sup>15</sup>), SC(O)N(R<sup>15</sup>)<sub>2</sub>, SC(O)NHR<sup>15</sup>, SO<sub>3</sub>M, SH, SR<sup>7</sup>, SO<sub>2</sub>M, S(O)R<sup>8</sup>, S(O)<sub>2</sub>R<sup>9</sup>, S(O)OR<sup>8</sup>, S(O)<sub>2</sub>OR<sup>9</sup>, PO<sub>3</sub>HM, PO<sub>3</sub>M<sub>2</sub>, P(O)(OR<sup>15</sup>)(OR<sup>16</sup>), P(O)(OR<sup>16</sup>)(OM), P(O)(R<sup>15</sup>)(OR<sup>8</sup>), P(O)(OM)R<sup>15</sup>, OO<sub>2</sub>M, CO<sub>2</sub>H, CO<sub>2</sub>R<sup>11</sup>, C(O), C(O)R<sup>12</sup>, C(O)(OR<sup>13</sup>), PO<sub>2</sub>M, P(O)(OR<sup>14</sup>), P(O)(R<sup>13</sup>), SO, SO<sub>3</sub>, C(O)(SR<sup>13</sup>), or SSR<sup>4</sup>; and

Y is CN, N<sub>2</sub>H<sub>2</sub>R<sup>13</sup>, N<sub>2</sub>HR<sup>13</sup>R<sup>14</sup>, N<sub>3</sub>, SCN, SCN<sub>2</sub>H<sub>2</sub>(R<sup>15</sup>)<sub>2</sub>, SC(O)N(R<sup>15</sup>)<sub>2</sub>, SC(O)NHR<sup>15</sup>, SO<sub>3</sub>M, SR<sup>4</sup>, SO<sub>2</sub>M, PO<sub>3</sub>HM, PO<sub>3</sub>M<sub>2</sub>, P(O)(OR<sup>15</sup>)(OR<sup>16</sup>), P(O)(OR<sup>16</sup>)(OM), P(O)(R<sup>15</sup>)(OR<sup>8</sup>), P(O)(OM)R<sup>15</sup>, CO<sub>2</sub>M, CO<sub>2</sub>H, CO<sub>2</sub>R<sup>11</sup>, C(O)R<sup>12</sup>, C(O)(SR<sup>13</sup>), SR<sup>5</sup>, or SSR<sup>5</sup>, or does not exist.

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10. The method of flaim 8, wherein:

R<sup>5</sup>, R<sup>6</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>12</sup>, R<sup>13</sup>, R<sup>14</sup>, R<sup>15</sup>, R<sup>16</sup> are the same or different and are alkyls containing 1-12 carbon atoms; or C<sub>1</sub> or C<sub>2</sub> connections to R<sup>1</sup> or R<sup>3</sup> in cyclic derivatives;

X is CH<sub>2</sub>, O/NH, NMe, S, SO<sub>3</sub>M, SH, SR<sup>7</sup>, SO<sub>2</sub>M, S(O)R<sup>8</sup>, S(O)<sub>2</sub>R<sup>9</sup>, S(O)OR<sup>8</sup>,

25  $S(O)_2OR^9$ ,  $PO_3M_2$ ,  $P(O)(OR^{15})(OR^{16})$ ,  $P(O)(OR^{16})(OM)$ ,  $P(O)(R^{15})(OR^8)$ ,  $PO_3HM$  or  $P(O)(OM)R^{15}$ ; and

Y is SO<sub>2</sub>M, SO<sub>3</sub>M, PO<sub>3</sub>HM, PO<sub>3</sub>M<sub>2</sub>, P(O)(OR<sup>15</sup>)(OR<sup>16</sup>), P(O)(OR<sup>16</sup>)(OM), SR<sup>5</sup>, SR<sup>4</sup> or SSR<sup>5</sup>, or does not exist.

11. A method for providing sedation, mitigating anxiety or providing anaesthesia in a subject in need thereof, comprising administering to a subject an effective amount of a therapeutic compound, wherein the therapeutic compound is of the formula (Ia):

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$$\begin{array}{c|c}
G_2 \\
G_1 \\
F_1 \longrightarrow C \longrightarrow F_2 \\
E \longrightarrow ONO
\end{array}$$

in which  $E, F_1, F_2, G_1, G_2$  are the same or different organic radicals which may be joined in cyclic ring systems, and which may contain inorganic counterions, but which do not contain an organic nitrate group;

with the proviso that when E and  $G_1$  are methylene groups and  $F_1$  is H,  $G_2$  is not a nitrate group, nor  $R^N$ - $Z^N$ -;

wherein  $R^N$  is any aryl or heteroaryl group and  $Z^N$  is  $(CO)_{mm}$ - $X^N_{nn}$ - $Y^N_{oo}$ ; wherein mm, nn, oo are 0 or 1 and  $X^N$ ,  $Y^N$  are NH,  $NR^{NN}$ , O or  $CH_2$ ; wherein  $R^{NN}$  is a short chain alkyl group  $(C_1 - C_{12})$ .

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12. A method for providing sedation, mitigating anxiety or providing anaesthesia in a subject in need thereof, comprising administering to a subject an effective amount of a therapeutic compound, wherein the therapeutic compound is of the formula (Ib):

(Ib) 
$$\begin{matrix} G_2 \\ G_1 \\ C - F_2 \\ E - ONO_2 \end{matrix}$$

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in which F<sub>2</sub> is an organic radical which may be joined in a cyclic ring system with G<sub>2</sub>,

and which may contain inorganic counterions, but is not a nitrate group; E and  $G_1$  are methylene groups;  $F_1$  is H; and  $G_2$  is  $R^N$ - $Z^N$ -;

wherein  $R^N$  is an organic radical possessing a heteroaryl group containing P or S atoms where said P or S are positioned  $\beta$ ,  $\gamma$ , or  $\delta$  to a nitrate group as identified in formula I; and  $Z^N$  is  $W^N_{mm}$ - $X^N_{nn}$ - $Y^N_{oo}$ ;

wherein mm, nn, oo are 0 or 1 and  $W^N$ ,  $X^N$ ,  $Y^N$  are NH, NR<sup>NN</sup>, CO, O or CH<sub>2</sub>; wherein  $R^{NN}$  is a short chain alkyl group  $(C_1 - C_{12})$ .

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13. Amethod for providing sedation, mitigating anxiety or providing anaesthesia in a subject in need thereof, comprising administering to a subject an effective amount of a therapeutic compound, wherein the therapeutic compound is of the formula (Ic):

$$\begin{array}{c}
G_{2} \\
\downarrow \\
G_{1} \\
\downarrow \\
F_{1} - C - F_{2} \\
\downarrow \\
\downarrow \downarrow_{2} E - ONO_{2}
\end{array}$$

in which E is  $(R^1R^2C)_m$  and  $G_2-G_1-CF_1F_2-$  is  $R^{19}-(R^3R^4C)_p-(R^{17}R^{18}C)_n-$ ; wherein: m, n,p are integers from 0 to 10;

R<sup>3,17</sup> are each independently hydrogen, a nitrate group, or A; and R<sup>1,4</sup> are each independently hydrogen, or A;

where A is selected from a substituted or unsubstituted aliphatic group (preferably a branched or straight-chain aliphatic moiety having from 1 to 24 carbon atoms in the chain, which optionally may contain O, S, NR<sup>6</sup> and unsaturations in the chain, optionally bearing from 1 to 4 hydroxy, nitrate, amino, aryl, or heterocyclic groups; an unsubstituted or substituted cyclic aliphatic moiety having from 3 to 7 carbon atoms in the aliphatic ring, which optionally may contain O, S, NR<sup>6</sup> and unsaturations in the ring, optionally bearing from 1 to 4 hydroxy, nitrate, amino, aryl, or heterocyclic groups; an unsubstituted or substituted aliphatic moiety constituting a linkage of from 0 to 5 carbons, between R<sup>1</sup> and R<sup>3</sup>

and/or between R<sup>17</sup> and R<sup>4</sup>, which optionally may contain O, S, NR<sup>6</sup> and unsaturations in the linkage, and optionally bearing from 1 to 4 hydroxy, nitrate, amino, aryl, or heterocyclic groups); a substituted or unsubstituted aliphatic group (preferably a branched, cyclic or straight-chain aliphatic moiety having from 1 to 24 carbon atoms in the chain) containing carbonyl linkages (e.g., C=O, C=S, C=NOH), which optionally may contain O, S, NR6 and unsaturations in the chain, optionally bearing from 1 to 4 hydroxy, nitrate, amino, aryl, or heterocyclic groups; a substituted or unsubstituted aryl group; a heterocyclic group; amino (including alkylamino, dialkylamino (including cyclic amino, diamino and triamino moieties), arylamino, diarylamino, and alkylarylamino); hydroxy; alkoxy; a substituted or unsubstituted aryloxy;

wherein X is F, Br, Cl, NO<sub>2</sub>, CH<sub>2</sub>, CF<sub>2</sub>, O, NH, NMe, CN, NHOH, N<sub>2</sub>H<sub>3</sub>, N<sub>2</sub>H<sub>2</sub>R<sup>13</sup>, N<sub>2</sub>HR<sup>13</sup>R<sup>14</sup>, N<sub>3</sub>, S, SCN, SCN<sub>2</sub>H<sub>2</sub>(R<sup>15</sup>)<sub>2</sub>, SCN<sub>2</sub>H<sub>3</sub>(R<sup>15</sup>), SC(O)N(R<sup>15</sup>)<sub>2</sub>, SC(O)NHR<sup>15</sup>, SO<sub>3</sub>M, SH, SR<sup>7</sup>, SO<sub>2</sub>M, S(O)R<sup>8</sup>, S(O)<sub>2</sub>R<sup>9</sup>, S(O)OR<sup>8</sup>, S(O)<sub>2</sub>OR<sup>9</sup>, PO<sub>2</sub>HM, PO<sub>3</sub>HM, PO<sub>3</sub>M<sub>2</sub>,  $P(O)(OR^{15})(OR^{16}), P(O)(OR^{16})(OM), R(O)(R^{15})(OR^8), P(O)(OM)R^{15}, CO_2M, CO_2H, CO_2R^{11},$ C(O), C(O)R<sup>12</sup>, C(O)(OR<sup>13</sup>), PO<sub>2</sub>H, PO<sub>2</sub>M, P(O)(OR<sup>14</sup>), P(O)(R<sup>13</sup>), SO, SO<sub>2</sub>, C(O)(SR<sup>13</sup>), SR<sup>5</sup>, SSR<sup>7</sup> or SSR<sup>5</sup>;

Y is F, Br, Cl, CH<sub>3</sub>, CF<sub>2</sub>H, CF<sub>3</sub>, OH, NH<sub>2</sub>, NHR<sup>6</sup>, NR<sup>6</sup>R<sup>7</sup>, CN, NHOH, N<sub>2</sub>H<sub>3</sub>,  $N_2H_2R^{13}$ ,  $N_2HR^{13}R^{14}$ ,  $N_3$ , S, SCN, SCN<sub>2</sub>H<sub>2</sub>( $R^{15}$ )<sub>2</sub>, SCN<sub>2</sub>H<sub>3</sub>( $R^{15}$ ), SC(O)N( $R^{15}$ )<sub>2</sub>, SC(O)NHR<sup>15</sup>,  $SO_3M$ , SH,  $SR^7$ ,  $SO_2M$ ,  $S(O)R^8$ ,  $S(O)_2R^9$ ,  $S(O)OR^8$ ,  $S(O)_2OR^9$ ,  $PO_2HM$ ,  $PO_3M_2$ ,  $P(O)(OR^{15})(OR^{16}), P(O)(OR^{16})(OM), P(O)(R^{15})(QR^8), P(O)(OM)R^{15}, CO_2M, CO_2H, CO_2R^{11},$ C(O)R<sup>12</sup>, C(O)(OR<sup>13</sup>), C(O)(SR<sup>13</sup>), SR<sup>5</sup>, SSR<sup>7</sup> or SSR<sup>5</sup>, or does not exist;

R<sup>2</sup>, R<sup>5</sup>, R<sup>18</sup>, R<sup>19</sup> are optionally hydrogen, A or X-Y;

R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup> R<sup>9</sup>, R<sup>11</sup>, R<sup>12</sup>, R<sup>13</sup>, R<sup>14</sup>, R<sup>15</sup>, R<sup>16</sup> are the same or different alkyl or acyl groups containing 1-24 carbon atoms which may contain 1-4 ONO2 substituents; or C1 - C6 connections to R1 - R4 in cyclic derivatives which may/contain 1-4 ONO2 substituents; or are each independently hydrogen a nitrate group or A;

M is H, Na<sup>+</sup>, K<sup>+</sup>, NH<sub>4</sub><sup>+</sup>, N<sup>+</sup>H<sub>k</sub>R<sup>11</sup><sub>(4-k)</sub> where k is  $0\frac{1}{3}$ ; or other pharmaceutically acceptable counterion;

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and with the proviso that when m = n = p = 1 and  $R^{19}$ ,  $R^2$ ,  $R^{18}$ ,  $R^1 = H$  and  $R^{17}$ ,  $R^3$  are nitrate groups,  $R^4$  is not H.

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14. The method of claim 11, wherein  $F_2$  is a nitrate group; and E,  $F_1$ ,  $G_1$ ,  $G_2$  are the same or different organic radicals which may be joined in cyclic ring systems, and which may contain inorganic counterions;

with the proviso that when E and  $G_1$  are methylene groups and  $F_1$  is H,  $G_2$  is not a nitrate group, nor  $R^N$ - $Z^N$ -;

wherein  $R^N$  is any aryl or heteroaryl group and  $Z^N$  is  $(CO)_{mm}$ - $X^N_{nn}$ - $Y^N_{oo}$ ; wherein mm, nn, oo are 0 or 1 and  $X^N$ ,  $Y^N$  are NH,  $NR^{NN}$ , O or  $CH_2$ ; wherein  $R^{NN}$  is a short chain alkyl group  $(C_1 - C_{12})$ .

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15. The method of claim 12, wherein  $F_2$  is a nitrate group; E and  $G_1$  are methylene groups;  $F_1$  is H; and  $G_2$  is  $R^N$ - $Z^N$ -;

wherein  $R^N$  is an organic radical possessing an heteroaryl group containing P or S atoms where said P or S are positioned  $\beta$ ,  $\gamma$ , or  $\delta$  to a nitrate group as identified in formula I; and  $Z^N$  is  $W^N_{mm} - X^N_{nn} - Y^N_{oo}$ ;

wherein mm, nn, oo are 0 or 1 and  $W^N$ ,  $X^N$ ,  $Y^N$  are NH,  $NR^{NN}$ , CO, O or CH<sub>2</sub>; wherein  $R^{NN}$  is a short chain alkyl group  $(C_1 - C_{12})$ .

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- 16. The method of claim 13, wherein R<sup>19</sup> is X-Y.
- 17. The method of claim 16, wherein:

R<sup>1</sup> and R<sup>3</sup> are the same or different and selected from H and C<sub>1</sub>-C<sub>4</sub>, alkyl chains, which chains may include one O linking R<sup>1</sup> and R<sup>3</sup> to form pentosyl, hexosyl, cyclopentyl, or cyclohexyl rings, which rings may optionally bear hydroxyl substituents;

 $R^2$  and  $R^4$  are the same or different and selected from H, a nitrate group,  $C_1$ - $C_4$  alkyl chains optionally bearing 1-3 nitrate groups, and acyl groups (-C(O)R<sup>5</sup>);

 $R^7$ ,  $R^{11}$  are the same or different  $C_1 - C_8$  alkyl or acyl;

R<sup>5</sup>, R<sup>6</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>12</sup>, R<sup>13</sup>, R<sup>14</sup>, R<sup>15</sup>, R<sup>16</sup> are the same or different and are alkyl groups containing 1-12 carbon atoms which may contain 1-4 ONO<sub>2</sub> substituents; or C<sub>1</sub> or C<sub>2</sub> connections to R<sup>1</sup> - R<sup>3</sup> in cyclic derivatives; and

M is H, Na<sup>+</sup>, K<sup>+</sup>, NH<sub>4</sub><sup>+</sup> or N<sup>+</sup>H<sub>k</sub>R<sup>11</sup><sub>(4-k)</sub>, where k is 0-3.

18. The method of claim 17, wherein m = 1, n = 0, p=1.

19. The method of claim 18, wherein:

X is CH<sub>2</sub>, O, NH, NMe, CN, NHOH, N<sub>2</sub>H<sub>3</sub>, N<sub>2</sub>H<sub>2</sub>R<sup>13</sup>, N<sub>2</sub>HR<sup>13</sup>R<sup>14</sup>, N<sub>3</sub>, S, SCN, SCN<sub>2</sub>H<sub>2</sub>(R<sup>15</sup>)<sub>2</sub>, SCN<sub>2</sub>H<sub>3</sub>(R<sup>15</sup>), SC(O)N(R<sup>15</sup>)<sub>2</sub>, SC(O)NHR<sup>15</sup>, SO<sub>3</sub>M, SH, SR<sup>7</sup>, SO<sub>2</sub>M, S(O)R<sup>8</sup>, S(O)<sub>2</sub>R<sup>9</sup>, S(O)OR<sup>8</sup>, S(O)<sub>2</sub>OR<sup>9</sup>, PO<sub>3</sub>HM, PO<sub>3</sub>M<sub>2</sub>, P(O)(OR<sup>15</sup>)(OR<sup>16</sup>), P(O)(OR<sup>16</sup>)(OM), P(O)(R<sup>15</sup>)(OR<sup>8</sup>), P(O)(OM)R<sup>15</sup>, CO<sub>2</sub>M, CO<sub>2</sub>H, CO<sub>2</sub>R<sup>11</sup>, C(O), C(O)R<sup>12</sup>, C(O)(OR<sup>13</sup>), PO<sub>2</sub>M, P(O)(OR<sup>14</sup>), P(O)(R<sup>13</sup>), SO, SO<sub>2</sub>, C(O)(SR<sup>13</sup>), or SSR<sup>4</sup>; and

Y is CN, N<sub>2</sub>H<sub>2</sub>R<sup>13</sup>, N<sub>2</sub>HR<sup>13</sup>R<sup>14</sup>, N<sub>3</sub>, SCN, SCN<sub>2</sub>H<sub>2</sub>(R<sup>15</sup>)<sub>2</sub>, SC(O)N(R<sup>15</sup>)<sub>2</sub>, SC(O)NHR<sup>15</sup>, SO<sub>3</sub>M, SR<sup>4</sup>, SO<sub>2</sub>M, PO<sub>3</sub>HM, PO<sub>3</sub>M<sub>2</sub>, P(O)(OR<sup>15</sup>)(OR<sup>16</sup>), P(O)(OR<sup>16</sup>)(OM), P(O)(R<sup>15</sup>)(OR<sup>8</sup>), P(O)(OM)R<sup>15</sup>, CO<sub>2</sub>M, CO<sub>2</sub>H<sub>3</sub> CO<sub>2</sub>R<sup>11</sup>, C(O)R<sup>12</sup>, C(O)(SR<sup>13</sup>), SR<sup>5</sup>, or SSR<sup>5</sup>, or does not exist.

20. The method of claim 18, wherein:

R<sup>5</sup>, R<sup>6</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>12</sup>, R<sup>13</sup>, R<sup>14</sup>, R<sup>15</sup>, R<sup>16</sup> are the same or different and are alkyls containing 1-12 carbon atoms; or C<sub>1</sub> or C<sub>2</sub> connections to R<sup>1</sup> or R<sup>3</sup> in cyclic derivatives;

X is CH<sub>2</sub>, O, NH, NMe, S, SO<sub>2</sub>M, SH, SR<sup>7</sup>, SO<sub>2</sub>M, S(O)<sub>2</sub>R<sup>9</sup>, S(O)<sub>2</sub>R<sup>9</sup>, S(O)OR<sup>8</sup>, S(O)<sub>2</sub>OR<sup>9</sup>, PO<sub>3</sub>M<sub>2</sub>, P(O)(OR<sup>15</sup>)(OR<sup>16</sup>), P(O)(OR<sup>16</sup>)(OM), P(O)(R<sup>15</sup>)(OR<sup>8</sup>), PO<sub>3</sub>HM or P(O)(OM)R<sup>15</sup>; and

Y is  $SO_2M$ ,  $SO_3M$ ,  $PO_3HM$ ,  $PO_3M_2$   $P(O)(OR^{15})(OR^{16})$ ,  $P(O)(OR^{16})(OM)$ ,  $SR^5$ ,  $SR^4$  or  $SSR^5$ , or does not exist.

21. The method of claim 3, with the proviso that when m = n = p = 1 and  $R^{19}$ ,  $R^2$ ,  $R^{18}$ ,  $R^1 = H$  and  $R^{17}$ ,  $R^3$  are nitrate groups,  $R^4$  is not  $C_1 - C_3$  alkyl.

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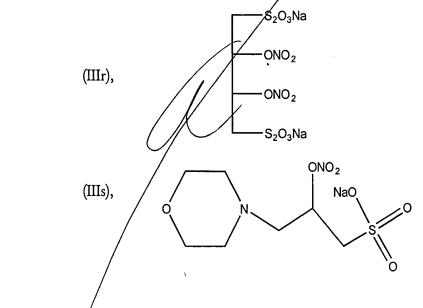
- 22. The method of claim 13, with the proviso that when m = n = p = 1 and  $R^{19}$ ,  $R^2$ ,  $R^{18}$ ,  $R^1 = H$  and  $R^{17}$ ,  $R^3$  are nitrate groups,  $R^4$  is not  $C_1 C_3$  alkyl.
- 23. The method of any one of claims 1, 2, 3, 4 or 5, further comprising administering the therapeutic compound with a pharmaceutically acceptable vehicle.

24. The method of any one of claims 11, 12, 13, 14 or 15, further comprising administering the therapeutic compound with a pharmaceutically acceptable vehicle.

10 25. The method of any one of claims 1, 2, 3, 4 or 5, wherein the therapeutic compound modulates levels of the cyclic nucleotides cGMP and/or cAMP in said subject.

26. The method of any one of claims 11, 12, 13, 14 or 15, wherein the therapeutic compound modulates levels of the cyclic nucleotides cGMP and/or cAMP in said subject.

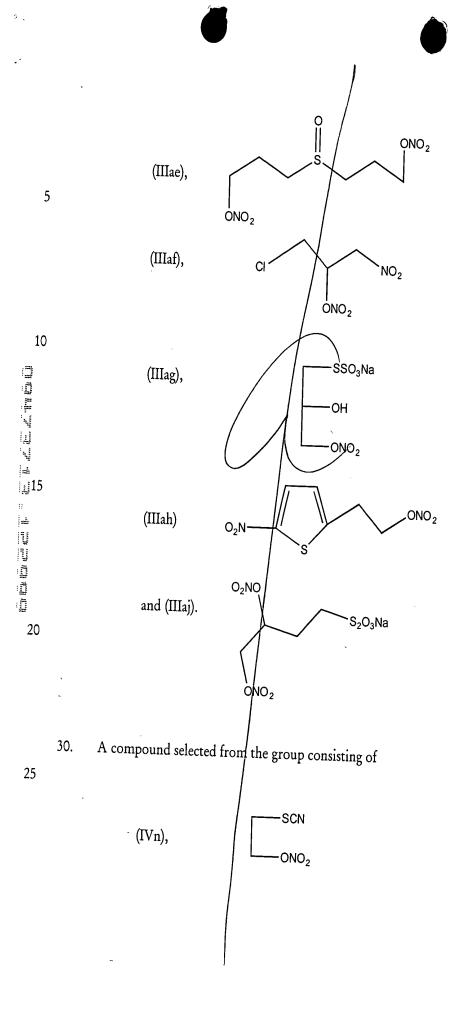
- 27. The method of any one of claims 1, 2, 3, 4 or 5, wherein the therapeutic compound modulates guanylyl cyclase activity in said subject.
- 28. The method of any one of claims 11, 12, 13, 14 or 15, wherein the therapeutic compound modulates guanylyl cyclase activity in said subject.
  - 29. A compound selected from the group consisting of



CO₂H O2NO//////... 5 (IIIt), O<sub>2</sub>NO<sup>IIIIII</sup> ·n<sub>IIII</sub>ONO<sub>2</sub> 10 ONO<sub>2</sub> (IIIu), .SO₂H SO<sub>2</sub>H (IIIv), ONO<sub>2</sub> -OH 20 OCH<sub>2</sub>CH<sub>3</sub> (IIIw), `OCH<sub>2</sub>CH<sub>3</sub> ·ONO<sub>2</sub> 25 ·CI OCH<sub>2</sub>CH<sub>3</sub> `ONa (IIIx), ·ONO<sub>2</sub> -CI

-ONO<sub>2</sub> (IIIy), -CI 5 O<sub>2</sub>NO (IIIz), ·SO₃H O<sub>2</sub>NQ 10 Br (IIIaa), 0NO2 O<sub>2</sub>NO ·SO<sub>3</sub>H (IIIab), ONO<sub>2</sub> -SCN (IIIac), ·ONO<sub>2</sub> ,ONO2 (IIIad), 25

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(IVo), ONa -0N0/ ONO 5 (IVp), ONQ ⁄6Nφ<sub>2</sub> ONO<sub>2</sub> 10 (IVq), O<sub>2</sub>NO ONO<sub>2</sub> (IVr), ONO<sub>2</sub> ·ONO<sub>2</sub> ONO<sub>2</sub> ·ONO<sub>2</sub> 20 ·SH (IVs) -ONO<sub>2</sub> ONO<sub>2</sub> 25 and (IVt). dNO2 φNΟ₂

A compound selected from the group consisting of 31.

(Vd),

(Vf),

(Vg),

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·ONO<sub>2</sub> NaO₂C ONO<sub>2</sub> CH<sub>3</sub> 01/0/2 OCH<sub>3</sub> ONO2 ONO<sub>2</sub> ·ONO<sub>2</sub> ONO<sub>2</sub> NO<sub>2</sub> 0002 -0NO<sub>2</sub>

(Vh),

-Br

.CO₂H

ONO<sub>2</sub>

ONO2

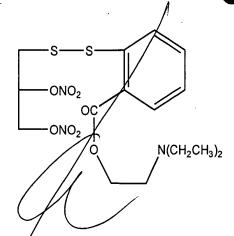
I NH<sub>2</sub>

$$(Vi), \qquad ONO_2$$

$$ONO_2$$

(Vu), -ONO<sub>2</sub> -ONO<sub>2</sub> 5 (Vv), -OH EtO<sub>2</sub>C -ONO<sub>2</sub>/ OCH<sub>3</sub> 10 (Vw), ONO<sub>2</sub> ONO<sub>2</sub> ·OMe -\$-(Vx), ONO<sub>2</sub> -ONO<sub>2</sub> (Vy), ONO<sub>2</sub> -ONO<sub>2</sub> 25 -s (Vz), -OH -OH ONO<sub>2</sub> -ONO<sub>2</sub>





A pharmaceutical composition comprising a said compound of any one of claims 29, 30 32. and 31 and a pharmaceutically acceptable vehicle.

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